

WHAT IS CLAIMED IS:

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1. A method for real-time measurement of the performance of communications on a large area network between a selected server and a plurality of users, based upon actual user experience, including:

(a) accessing a server log having records of actual user access to the selected server;

(b) aggregating records from the server log into a plurality of aggregate slots, each having at least one time bin, based on an aggregation method;

(c) performing at least one statistical analysis of each time bin of each aggregate slot; and

(d) outputting the results of such statistical analysis as an indication of actual server usage by users.

2. The method of claim 1, further including filtering out selected records from the server log before the step of aggregating.

3. The method of claim 1, further including generating an event notification if a selected statistical analysis value is abnormal.

4. The method of claim 1, further including selecting the aggregation method from a set of aggregation methods.

1 5. The method of claim 1, wherein the aggregation
2 method includes aggregation by log-file record column data
3 value for each record from the server log.

1 6. The method of claim 1, further including:
2 (e) determining geographical or source information for each
3 record; and
4 (f) selecting the aggregation method to aggregate records
5 based on such geographical or source information.
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7 7. The method of claim 6, wherein determining
8 geographical or source information for each record includes:
9 (g) defining a database comprising large area network
10 address blocks having geographical or source
11 information;
12 (h) comparing an address field in each record to the address
13 blocks in the database; and
14 (i) associating with each record the geographical or source
15 information from an address block matching the address
16 field of the record.
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18 8. The method of claim 7, wherein comparing an address
19 field in each record to the address blocks in the database
20 includes:

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- 21 (j) defining an array of binary trees for the address blocks
22 in the database, each address block within a binary tree
23 within an array element being masked by a corresponding
24 unique subnet mask value;
- 25 (k) masking each address field in each record by a unique
26 subnet value corresponding to a selected array element;
- 27 (l) comparing each masked address field to an address field
28 of the address blocks within the binary tree of the
29 selected array element;
- 30 (m) outputting selected fields of any matching address
31 block; and
- 32 (n) otherwise, continuing the step of comparing with a next
33 selected array element until a match is found or all
34 array elements have been compared.

1 9. The method of claim 1, further including:

- 2 (o) determining exit routing paths from each selected server
3 based on the records from the server log;
- 4 (p) determining a best performing exit route based on the
5 statistical analysis of records from the server log;
- 6 (q) biasing incoming and outgoing communications with
7 respect to each server to use the determined best
8 performing exit route.
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10. A method for comparing an address field of a large area network record to a database comprising large area network address blocks having geographical or source information, including:

- (r) defining an array of binary trees for the address blocks in the database, each address block within a binary tree within an array element being masked by a corresponding unique subnet mask value;
- (s) masking the address field of a large area network record by a unique subnet value corresponding to a selected array element;
- (t) comparing each masked address field to an address field of the address blocks within the binary tree of the selected array element;
- (u) indicating a match; and
- (v) otherwise, continuing the step of comparing with a next selected array element until a match is found or all array elements have been compared.

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1 11. A system for real-time measurement of the
2 performance of communications on a large area network
3 between a selected server and a plurality of users, based
4 upon actual user experience, including:

- (w) a server log having records of actual user access to the selected server;

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(x) means for accessing and aggregating records from the server log into a plurality of aggregate slots, each having at least one time bin, based on an aggregation method;

(y) means for performing at least one statistical analysis of each time bin of each aggregate slot; and

(z) means for outputting the results of such statistical analysis as an indication of actual server usage by users.

12. The system of claim 11, further including means for filtering out selected records from the server log before the step of aggregating.

13. The system of claim 11, further including means for generating an event notification if a selected statistical analysis value is abnormal.

14. The system of claim 11, further including means for selecting the aggregation method from a set of aggregation methods.

15. The system of claim 11, wherein the aggregation method includes aggregation by log-file record column data value for each record from the server log.

16. The system of claim 11, further including:

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- 2 (aa) means for determining geographical or source
3 information for each record; and
4 (bb) means for selecting the aggregation method to
5 aggregate records based on such geographical or source
6 information.

1 17. The system of claim 16, wherein the means for
2 determining geographical or source information for each record
3 includes:

- 4 (cc) a database comprising large area network address
5 blocks having geographical or source information;
6 (dd) a comparison function for comparing an address field
7 in each record to the address blocks in the database;
8 and
9 (ee) an associating function for associating with each
10 record the geographical or source information from an
11 address block matching the address field of the record.

1 18. The system of claim 17, wherein the comparison
2 function includes:

- 3 (ff) an array of binary trees for the address blocks in
4 the database, each address block within a binary tree
5 within an array element being masked by a corresponding
6 unique subnet mask value;

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7 (gg) means for masking each address field in each record
8 by a unique subnet value corresponding to a selected
9 array element;
10 (hh) means for comparing each masked address field to an
11 address field of the address blocks within the binary
12 tree of the selected array element;
13 (ii) means for outputting selected fields of any matching
14 address block; and
15 (jj) means for otherwise continuing the step of comparing
16 with a next selected array element until a match is
17 found or all array elements have been compared.

1 19. The system of claim 11, further including:

2 (kk) means for determining exit routing paths from each
3 selected server based on the records from the server
4 log;

5 (ll) means for determining a best performing exit route
6 based on the statistical analysis of records from the
7 server log;

8 (mm) means for biasing incoming and outgoing
9 communications with respect to each server to use the
10 determined best performing exit route.

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1 20. A system for comparing an address field of a large
2 area network record to a database comprising large area

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3 network address blocks having geographical or source
4 information, including:
5 (nn) an array of binary trees for the address blocks in
6 the database, each address block within a binary tree
7 within an array element being masked by a corresponding
8 unique subnet mask value;
9 (oo) means for masking the address field of a large area
10 network record by a unique subnet value corresponding to
11 a selected array element;
12 (pp) means for comparing each masked address field to an
13 address field of the address blocks within the binary
14 tree of the selected array element;
15 (qq) means for indicating a match; and
16 (rr) means for otherwise continuing the step of comparing
17 with a next selected array element until a match is
18 found or all array elements have been compared.

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1 21. A computer program, stored on a computer-readable
2 medium, for real-time measurement of the performance of
3 communications on a large area network between a selected
4 server and a plurality of users, based upon actual user
5 experience, the computer program comprising instructions
6 for causing a computer system to:
7 (ss) access a server log having records of actual user
8 access to the selected server;

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9 (tt) aggregate records from the server log into a
10 plurality of aggregate slots, each having at least one
11 time bin, based on an aggregation method;
12 (uu) perform at least one statistical analysis of each
13 time bin of each aggregate slot; and
14 (vv) output the results of such statistical analysis as
15 an indication of actual server usage by users.

1 22. The computer program of claim 21, further including
2 instructions for causing the computer system to filter out
3 selected records from the server log before the step of
4 aggregating.

1 23. The computer program of claim 21, further including
2 instructions for causing the computer system to generate an
3 event notification if a selected statistical analysis value is
4 abnormal.

1 24. The computer program of claim 21, further including
2 instructions for causing the computer system to select the
3 aggregation method from a set of aggregation methods.

1 25. The computer program of claim 21, wherein the
2 aggregation method includes aggregation by log-file record
3 column data value for each record from the server log.

1 26. The computer program of claim 21, further including
2 instructions for causing the computer system to:

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3 (ww) determine geographical or source information for
4 each record; and
5 (xx) select the aggregation method to aggregate records
6 based on such geographical or source information.

1 27. The computer program of claim 26, wherein the
2 instructions for causing the computer system to determine
3 geographical or source information for each record further
4 include instructions for causing the computer system to:

5 (yy) define a database comprising large area network
6 address blocks having geographical or source
7 information;

8 (zz) compare an address field in each record to the
9 address blocks in the database; and

10 (aaa) associate with each record the geographical or
11 source information from an address block matching the
12 address field of the record.

1 28. The computer program of claim 27, wherein the
2 instructions for causing the computer system to compare
3 an address field in each record to the address blocks in
4 the database include instructions for causing the
5 computer system to:

6 (bbb) define an array of binary trees for the address
7 blocks in the database, each address block within a

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8 binary tree within an array element being masked by a
9 corresponding unique subnet mask value;
10 (ccc) mask each address field in each record by a unique
11 subnet value corresponding to a selected array element;
12 (ddd) compare each masked address field to an address
13 field of the address blocks within the binary tree of
14 the selected array element;
15 (eee) output selected fields of any matching address
16 block; and
17 (fff) otherwise, continue the step of comparing with a
18 next selected array element until a match is found or
19 all array elements have been compared.

1 29. The computer program of claim 21, further including
2 instructions for causing the computer system to:

3 (ggg) determine exit routing paths from each selected
4 server based on the records from the server log;
5 (hhh) determine a best performing exit route based on the
6 statistical analysis of records from the server log;
7 (iii) bias incoming and outgoing communications with
8 respect to each server to use the determined best
9 performing exit route.

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1 30. A computer program, stored on a computer-readable
2 medium, for comparing an address field of a large area
3 network record to a database comprising large area

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4 network address blocks having geographical or source
5 information, the computer program comprising instructions
6 for causing a computer system to:

7 (jjj) define an array of binary trees for the address
8 blocks in the database, each address block within a
9 binary tree within an array element being masked by a
10 corresponding unique subnet mask value;

11 (kkk) mask the address field of a large area network
12 record by a unique subnet value corresponding to a
13 selected array element;

14 (lll) compare each masked address field to an address
15 field of the address blocks within the binary tree of
16 the selected array element;

17 (mmm) indicate a match; and

18 (nnn) otherwise, continue the step of comparing with a
19 next selected array element until a match is found or
20 all array elements have been compared.

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